

Conducting a Boiler Room Assessment

Properly conducted, a boiler room assessment helps increase efficiency, sustainability, reliability and safety. Any facility that consistently focuses on these areas will perform at its optimal level. For most facilities, an outside specialist should conduct the boiler room assessment because it requires a specific methodology and expertise.

Efficiency. A boiler room assessor will determine the fuel-to-steam efficiency by evaluating the boiler's burner, its physical condition and features. The assessor will also use the procedure outlined in ASME PTC 4-2008 to determine actual efficiency. This procedure takes a number of variables into account, including: stack loss, steam and feedwater flow, moisture in the stack gas and clocking of the fuel meter for actual input. The goal is safe, efficient combustion, and optimal heat transfer in the boiler. To accomplish this, a burner is typically set at about 3% O₂ or 15% excess air.

The assessor will then observe how well the boiler (heat exchanger) absorbs heat from the burner. If the burner is operating and combusting properly, the temperature of the flue gas should be approximately 50 – 100 degrees above the saturated temperature in the boiler. The assessor will also look for possible climatic variables, such as relative humidity in the boiler room or barometric pressure fluctuations, and most importantly, ambient air temperature. At the same time the professional is taking note of climatic conditions, he or she is also paying close attention to the burner's combustion control system.

Improving efficiency is not just limited to the boiler. There are many other areas in a boiler room that an assessor will evaluate, including the exhaust stack/breeching arrangement and support accessories.

Sustainability. Facilities today are seeking ways to conserve the finite resources of fuel, air and water. Fresh water is becoming a scarcity, and that is one of the important reasons why returning condensate is important. In terms of cleaner air, today there is an array of high-efficiency, low-emitting burners to dramatically reduce NO_x and CO emissions. The assessor will evaluate current systems and recommend additional ways to conserve natural resources and reduce emissions.

Reliability. The assessor will thoroughly check the burner, its combustion control system and its burner management system (BMS), which controls all the burner sequencing and monitors the burner's safeties. It is important that a BMS includes all of the lock-out information in a clear and readily understandable way and has the capacity to log and store fault history. Today's systems that are PLC-based integrate not only the burner and its operation and faults, but all the accessory equipment too.

Another very important factor that contributes to reliable boiler operation is an ongoing maintenance program. The assessor will ask for service records detailing when tune-ups were performed, including efficiency checks. From a reliability perspective, the assessor will look for elevated stack temperatures that could possibly be caused by either fireside or waterside fouling, which along with energy loss, could seriously damage the boiler. The boiler room log is critical and must be maintained correctly and consistently or reliability and possible safety problems will result.

Safety. Among the safety items the assessor will look for are how steam line drip pockets are sized and located along with the steam trap location(s) and functionality. Improper location, sizing and functioning of these items can cause serious and dangerous water hammer. Another very key safety area that will be scrutinized is the condition of both



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- For most facilities, a specialist should be hired to conduct the assessment
- Maintain a boiler room log and good service records for the specialist to analyze



the main and auxiliary low-water cutoffs. The piping for the boiler's safety relief valve(s) will also be checked.

After completing his observations, the assessor will review the findings with facility management and then prepare a formal report that includes the discoveries and a plan for the facility going forward. The report also will likely include mark-ups of the plant's existing P&IDs (process and instrumentation diagrams) that detail recommended changes.

To learn more about boiler room assessments, watch the [Key Factors and Methodology for Boiler Room Assessments](#) webinar or contact your [local Cleaver-Brooks representative](#).